



GRAIN INSPECTION, PACKERS AND STOCKYARDS ADMINISTRATION

Technical Services Division

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U.S. CORN INSPECTION

DEFINITION OF CORN

Corn is defined as: *Grain that consists of 50 percent or more of whole kernels of shelled dent corn and/or shelled flint corn (Zea mays L.) and not more than 10.0 percent of other grains for which standards have been established under the United States Grain Standards Act.*

Whole kernels are kernels with three-fourths or more of the kernel present. Other grains for which standards have been established are barley, canola, flaxseed, oats, rye, sorghum, soybeans, sunflower seed, triticale, and wheat.

CLASSES

Corn is divided into three classes based on color: Yellow corn, White corn, and Mixed corn. Each class is divided into five U.S. numerical grades and U.S. Sample grade. White corn is considered a food grade corn, while Yellow corn is primarily used for animal feed.

Yellow Corn: Yellow-kerneled and contains not more than 5.0% of Corn of Other Colors. Includes yellow kernels with a slight tinge of red.

White Corn: White-kerneled and contains not more than 2.0% of Corn of Other Colors. Includes white kernels with a slight tinge of light straw or pink color.

Mixed Corn: Corn that does not meet the color requirements for either yellow or white corn.

SPECIAL GRADES

Special grades are provided to emphasize special qualities or conditions affecting the value and are added to and made a part of the grade designation. They do not affect the numerical or sample grade designation.

The U.S. Standards define the following special grades in corn: Flint, Flint and Dent, Infested, and Waxy.

Flint Corn. Corn that consists of 95 percent or more of flint corn. While Flint corn is grown extensively in South America and Argentina, very little Flint corn is produced in the U.S. Flint is characterized by rounded crowns and the kernels are usually smaller than dent.

The majority of the corn grown in the U.S. is Dent corn. Dent is characterized by the distinct depression in the crown of the kernel.

Flint and Dent Corn. Corn that consists of a mixture of flint and dent corn containing more than 5.0 percent but less than 95 percent of flint corn.

Infested Corn. Corn that is infested with live weevils or other live insects injurious to stored grain.

Waxy Corn. Corn that consists of 95 percent or more waxy corn. Waxy corn contains 100% amylopectin, which cooks more easily and gives a clear paste.

CORN GRADING STEPS

- STEP 1. Examine the sample for heating, odor, animal filth, castor beans, crotalaria seeds, glass, insect infestation, stones, unknown foreign substances, and other unusual conditions.
- STEP 2. Determine the moisture content.
- STEP 3. Determine the test weight per bushel of the sample.
- STEP 4. Determine the percentage of Broken Corn and Foreign Material (BCFM) in the sample.
- STEP 5. Divide out representative portions from the BCFM-free sample and determine the percentage of class, damaged kernels, flint corn, flint and dent corn, heat-damaged kernels, and waxy corn.
- STEP 6. When requested by applicant, divide out a representative portion from the BCFM-free sample and determine the percentage of protein, oil, and/or starch.
- STEP 7. When requested by applicant analyze 10 pounds of representative sample for aflatoxin (ppb) or 250 grams for vomitoxin (ppm) or zearalenone (ppm).

MOISTURE

While not a grading factor, moisture is determined on all corn samples. The moisture content of grain is very important to its storability and can affect end-use. Excessively fast drying causes stress cracks which increase the likelihood of breakage as the corn moves through the market.

TEST WEIGHT

The weight per Winchester bushel (2,150.42 cubic inches) as determined using an approved device according to procedures prescribed in FGIS instructions.

DAMAGED KERNELS

Kernels and pieces of corn kernels that are badly ground-damaged, badly weather-damaged, diseased, frost-damaged, germ-damaged, heat-damaged, insect-bored, mold-damaged, sprout-damaged, or otherwise materially damaged.

BROKEN CORN AND FOREIGN MATERIAL

Broken Corn and Foreign Material. All matter that passes readily through a 12/64 round-hole sieve and all matter other than corn that remains in the sieved sample after sieving according to procedures prescribed in FGIS instructions.

CORN GRADES AND GRADE REQUIREMENTS

Grade	Minimum test weight per bushel (pounds)	Maximum Limits of--		
		Damaged Kernels		Broken corn and foreign material (percent)
		Heat damaged kernels (percent)	Total (percent)	
U.S. No. 1	56.0	0.1	3.0	2.0
U.S. No. 2	54.0	0.2	5.0	3.0
U.S. No. 3	52.0	0.5	7.0	4.0
U.S. No. 4	49.0	1.0	10.0	5.0
U.S. No. 5	46.0	3.0	15.0	7.0

U.S. Sample grade is corn that:

- (a) Does not meet the requirements for the grades U.S. Nos. 1, 2, 3, 4, or 5; or
- (b) Contains stones which have an aggregate weight in excess of 0.1 percent of the sample weight, 2 or more pieces of glass, 3 or more crotalaria seeds (*Crotalaria* spp.), 2 or more castor beans (*Ricinus communis* L.), 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic substance(s), 8 or more cockleburrs (*Xanthium* pp.) or similar seeds singly or in combination, or animal filth in excess of 0.20 percent in 1000 grams; or
- (c) Has a musty, sour, or commercially objectionable foreign odor; or
- (d) Is heating or otherwise of distinctly low quality.

BASIS OF DETERMINATION		
Lot as a Whole	Factors Determined Before the Removal of Broken Corn and Foreign Material	Factors Determined After the Removal of Broken Corn and Foreign Material
Distinctly low quality Heating Infested Odor	Distinctly low quality Heating Infested Kind of grain Moisture Odor Stones Test weight U.S. Sample grade factors	Class Damaged kernels Flint corn Flint and dent corn Heat-damaged kernels Odor Waxy

OPTIONAL INSPECTION SERVICES

Other services also available for describing the quality and characteristics of corn are Stress Crack Analysis, Protein, Oil, and Starch content, aflatoxin, vomitoxin, zearalenone, ethylene dibromide residues, and pesticide residues.

Processing the Work Sample

